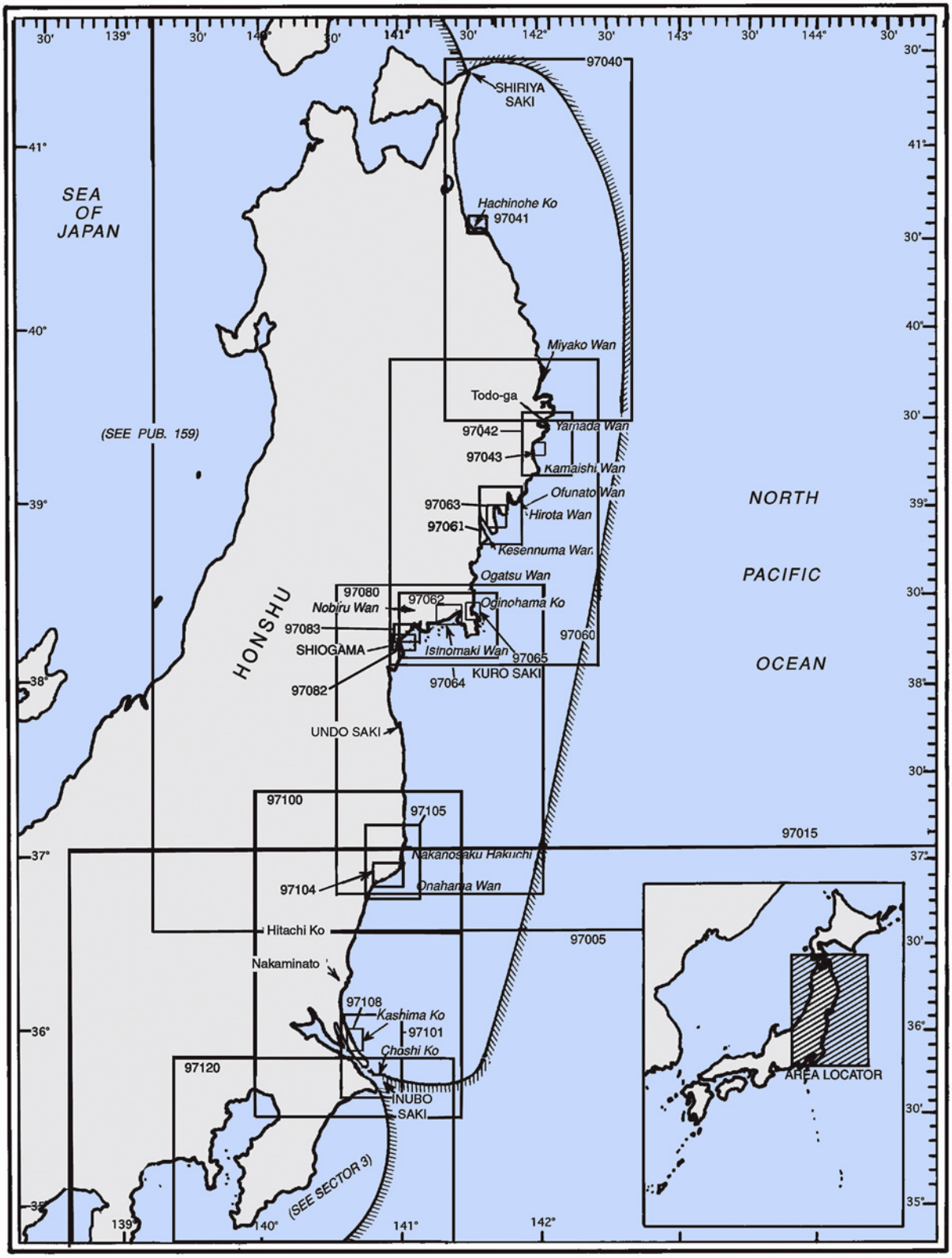
Click on "See Sector" to be hotlinked to that Sector.



Additional chart coverage may be found in CATP2, Catalog of Nautical Charts.

SECTOR **2** — CHART INFORMATION

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SECTOR 2

EAST COAST OF HONSHU—SHIRIYA SAKI TO INUBO SAKI

Plan.—The E coast of Honshu is described from Shiriya Saki, the NE extremity of the island, S to Inubo Saki. The sector is described from N to S.

General Remarks

2.1 This sector describes the coast of Honshu that is fronted by the Pacific Ocean. The coast extends S from Shiriya Saki, for about 345 miles, to Inubo Saki. Todo Saki, 116 miles S of Shiriya Saki, is the E extremity of the island of Honshu.

The principal dangers along this coast, with a few exceptions, are contained within the 20m line. Off-lying dangers are described in order with the appropriate coastal section.

The mountains which rise inland, N of Same Kaku, offer no marks from the far offing, but S of Same Kaku there are several mountains which serve as useful marks.

An Ocean Data Acquisition System lighted buoy is moored well offshore in position 36˚40'N, 145˚40'E.

Winds—Weather.—Since the E coast of Honshu, fronting on the Pacific Ocean, is backed by mountainous terrain and faces Oyashio, the climate is controlled by these features.

The E coast of Honshu is generally very cold during the winter. Temperatures are low, and there are frequent blizzards with strong W to NW winds. On the coast from Shiriya Saki to Hachinohe Ko, it is reported that there are often snowstorms at sea E of Ogawara Ko, even when the weather is clear at Hachinohe Ko.

The summer climate is generally hot under the influence of the North Pacific high, with relatively light SE winds. Ocean fogs are frequent. Also, in years when the Okhotsk high is unusually developed, the early summer rainy season front lingers over Honshu much longer than normal.

Temperatures in this area are lower, both summer and winter. Mean annual temperatures are about 7˚ lower than those of other localities at the same latitudes in the Northern Hemisphere.

The number of stormy days in this coast are greater in the spring than in the winter, except in the vicinity of Shiriya Saki.

At Shiriya Saki, strong winds persist throughout the year, especially the seasonal winter wind, which will blow several days continuously from the W, at speeds of over 19 knots. Vessels sailing in this area during the winter should pay strict attention to weather reports. In summer, a SE wind prevails; however, since fog formation makes navigating hazardous, this condition should be treated with the same degree of attention as the winter winds.

On this coast, weather reports are broadcast from the radiobeacon and direction finding stations at Shiriya Saki, Todoga Saki, and Kinkasan.

Tides—Currents.—In general, tidal currents are weak, setting S and N in most places. They are influenced by the S ocean currents, and often flow in irregular directions and with irregular speeds.

To the NE of Shiraya Saki, the flood current sets S and the ebb current sets N.

On the coast from Shiraya Saki to Kuro Saki, the flood current sets SW and the ebb tide sets NE, with a weak current. At maximum strength, there is acceleration as the current sets S. The N or S flow is strongest N of Same Kaku at the high or low tide.

The time of maximum velocity is 5 hours later from the time of high or low water off Same Kaku, 4 hours afterward off Kuji Ko, and 3 hours after off Kuro Saki.

At a point 1.5 miles E of Todoga Saki, a tidal current of 1.8 knots has been measured on the final day of the summer high tides flowing S; at a point 2 miles off Kobe Saki, the current was measured at 1.5 knots flowing SSW, also on the final day of summer high tides.

Off the area from Kesennuma Wan entrance to the Enoshima Retto, the flood current sets N and the ebb current sets S. Off Kinkasan and Enoshima Retto, the flood current sets W while the ebb current sets E. In all these areas, the strength of the current is weak.

Shiriya Saki to Same Kaku

2.2 **Shiriya Saki** (Siriya Saki) (41˚26'N., 141˚28'E.), the NE extremity of Honshu, is the termination of a projection whose outer part is low. There is a light and radiobeacon situated here. A ramark also transmits from the vicinity of the light. An orange obstruction buoy lies 58 miles E of Shiriya Saki. From Shiriya Saki to Same Kakul (Same Kado), 55 miles to the S, the coast consists entirely of a sandy beach, except for cliffs around Kukidono Saki and Nakayama Saki, 3 and 20 miles, respectively, S of Shiriya Saki. The area S of Nakayama Saki is especially sandy, marked by low hills, and the outlets of marshes are connected to the plain. The 20m line lies from 1 mile offshore in the N to 2 miles offshore in the S.

Dangers.—There are many dangers within a 1 mile radius of Shiriya Saki, including O Ne.

2.3 **O Ne** (41˚26'N., 141˚29'E.), with a least depth of 0.3m, lies 0.9 mile ENE of Shiriya Saki. An abundance of seaweed causes the water to look red, but this is not evident in poor light. In calm weather, the rocks are difficult to identify, but swells break over them in rough weather. There are many wrecks, submerged rocks, and rocks awash in this vicinity.

A long rock shelf under 36m in depth runs for 3 miles NNE of Shiriya Saki. Its E slope is steep, but the N and W sides are more gradual. Swift violent currents flow continuously above this shelf.

Sunken rocks lie 1 mile off the coast, about 1.3 miles S of Shiriya Saki. Waves will break on the rocks in strong winds. Todo Shima is a prominent black islet about 16m high, 0.3 mile NNE of Shiriya Saki.

Shikkari Hakuchi, about 3.8 miles S of Shiriya Saki, has a sandy shoreline and bottom. This area is used as a stopping place by many vessels waiting for the winter westerlies to calm down. Many ships anchor here when heading toward Isugaru

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Kaikyo. Care should be exercised because, close to the shore, the bottom is rocky and fixed fishing nets are laid out throughout the year. Further offshore the bottom is sandy and the holding ground is good.

Shiranuka Ko is a small fishing harbor on the N side of Monomi Saki, about 18 miles S of Shiriya Saki. A light is shown from Shiranuka Ko and Monomi Saki.

Kitatadai Ne and Minamitadai Ne are two shoals located 8 miles NNE of Monomi Saki, and about 1 mile offshore. The depths on these shoals are 12.8 and 14.6m.

From Shiranuka Ko, the coast trends in a southerly direction about 37 miles to Same Kaku.

Mutsu-Ogawara Ko (40˚57'N., 141˚25'E.) consists of a large, lighted superbuoy about 1.5 miles offshore, 4 miles NNE of the entrance to Takase Kawa. An oil pipeline connects the mooring buoy to the shore.

Wave recorders, connected to the shore W by submarine cables, are situated on the seabed 2 miles SSE and 2 miles SSW of the superbuoy.

An orange spherical buoy is moored 5 miles SSE of the superbuoy.

Hachinohe Ko (Hatinohe Ko) (40˚32'N., 141˚33'E.)

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2.4 Hachinohe Ko, on the W side of Same Kaku, is an industrial center. The port includes the districts, from E to W, of Samemachi, Shirogane (Shirokane), Minatomachi, and Konakanomachi. There are fishing harbors at Samemachi and Minatomachi, and there is also a whaling station at Samemachi. There are extensive breakwaters which protect the harbor area that is open to the N and is exposed to the strong N winter winds. Extensive reclamation work has taken place, NE of Kawajiri East Breakwater, NW of River Mouth Breakwater and SW of the breakwater which form the SW side of West Fairway.

Winds—Weather.—The winds, prevailing throughout the year, are SW winds. When a low pressure moves S of Hachinohe Ko, a strong N or E wind comes up, causing breakers in waters under 20m. Heavy fogs may occur from June thru August. During January and February, the average is 22 days of snow per month. The snowstorms usually last for several days.

Tides—Currents.—Extensive recent construction on numerous breakwaters in this general area may have altered the directions of the currents. Prior to the construction, the S resultant of the current and the tidal currents diverted the outflow from the rivers, and there was always an easterly set on Kabu Shima that gave rise to a small countercurrent in the vicinity, especially for two or three days after a strong W or N wind had been blowing. Strong SE winds set up a W current.

Since the completion of an outer breakwater, the port is protected from high waves from the open sea. When there is a strong N wind, however, swells may penetrate into District 1 and District 2, so that the approach becomes difficult. Also when there is a strong E wind, the W channel may become impossible to use because of strong oscillatory waves.

Depths—Limitations.—The 10m line extends to the entrance of the E breakwaters and to the E breakwater on the W side of the harbor.

The depth in the E passage approaching the port is 10m; Hattaro Passage has a dredged depth of 13m (1991), although shoaling is liable to occur. Draft limitation in the channel is 12m at LW. There are tanker berths for vessels up to 5,000 dwt, with a maximum draft of 6.5m, and two LNG berths. The port will accommodate vessels up to 50,000 dwt, with a maximum length of 230m and a draft of 13m.

Aspect.—Monomi Ishi (Monomi Iwa), a large rock, surmounts a hill 52m high on Same Kaku. Seen from the SE, the hill appears saddle-shaped; from the NE the summit appears pointed.

A power station chimney, painted in red and white bands, 122m high, is the highest of four chimneys situated about 3 miles WSW of Monomi Ishi. A chimney, 82m high, the tallest of three chimneys, is situated about 2.5 miles NW of the chimney, 122m high, mentioned above.

Hashikame Dake (Hasikami Take), 740m high, 8 miles S of Same Kaku, is a useful mark when approaching from the N.

Pilotage.—Pilotage is not compulsory; however, harbor pilots are available and arranged by the ship's agent upon the master's request. Vessel must keep the agent advised of its ETA in order to inform the pilot of the exact ETA. The pilot boards at the quarantine anchorage. For deep-draft vessels, the pilot boards from position 40˚33.5'N, 141˚33.3'E. The pilot boat is unable to communicate directly with vessels; therefore, vessels must keep close communication with agents. Pilotage is only available from 0600 to sunset for entry and 0600 to 2200 for sailing. Vessels should communicate with the harbormaster on VHF channel 16.

Regulations.—Navigation is prohibited within 30m of tankers loaded with flammable dangerous cargo berthed in the harbor, unless specifically authorized by the harbormaster. Vessels so loaded are required to display a notice to this effect, illuminated at night.

Anchorage.—The quarantine anchorage is established 1.5 miles N of the North Breakwater Light. The mid-segment of the line connecting the W end of the W breakwater with the NE end of the Shirogane Wharf is 7m deep, with a fine sand bottom and good holding. Anchorage is good on the S side of the N breakwater, but in a strong N wind, swells pour over the breakwater. There is also open sea anchoring, in depth of 22m, with a sandy bottom in the vicinity of 40˚34.0'N, 141˚33.5'E. Pilots will board at this position regardless of weather conditions. Vessels carrying dangerous cargo should anchor in District 3 and display the proper signs.

Caution.—During the fishing season, June to November, 400 to 500 fishing vessels leave the port daily, usually between 1200 and 1700.

A wave meter lies on the sea bed approximately 0.9 mile N of Kabu Shima; it is connected to the shore by two submarine cables.

2.5 **Same Kaku** (Same Kado) (40˚32'N., 141˚35'E.) is fringed with numerous sunken rocks. Kabayama Ne, with a least depth of 4.1m; Ogomune, with a least depth of 1.7m; and Ko Ne, with a least depth of 2.2m lie, respectively, 0.6 mile NNW, 0.6 mile NW, and 1.1 miles WNW of Same Kaku Light.

Hinode Iwa, three rocks between 0.7 to 3.3m high, lie 0.6 mile NW of the light. Ko Ne is seldom marked by breakers, except during strong winds. Care should be taken against being set to the E upon these dangers.

Dangerous wrecks lie 0.5 mile NE of Same Kaku Light, and about 0.1 mile SE of Kawaragi East Breakwater Light.

Rocks, with a depth of 10m, lie 0.9 mile E of Same Kaku Light.

Same Kaku to Miyako Ko

2.6 From Same Kaku to Miyako Ko, 55 miles SSE, the land slopes gradually to the sea and terminates for the most part in steep cliffs or crumbling slopes. There are occasional sandy beaches along this coast, which is indented by two shallow bays, Kuji Wan and Noda Wan, 24 and 30 miles, respectively, SSE of Same Kaku. There are no good landmarks along this coast except Hashikame Dake, previously described in paragraph 2.4, and Kujihira Take (Kuzihira Take) (40˚21'N., 141˚37'E.), 706m high, located 3 miles SSE of Hashikame Dake.

The coast is generally steep-to and deep, but dangerous sunken and above-water rocks lie up to 1 mile offshore.

Caution.—Fog is common on this coast in the summer, especially in June and July. Traffic is heavy, with squid fishing vessels in the summer and mackerel-pike fishing vessels in autumn.

Yagi Ko (40˚21'N., 141˚46'E.) is a small fishing harbor protected by breakwaters situated 14 miles SSE of Same Kaku. A light is shown from the breakwater, and two leading lights, in line bearing 236.8˚, shown from concrete towers, lead clear of dangers to the harbor entrance.

Shigeta Su (Tsugeta Su), a rock with a depth of 5.9m, lies near the 20m line, 1.3 miles N of Yagi Ko. Several sunken rocks are along this coast between Hashikami Light, 7 miles NW of Yagi Ko, and Yagi Ko. These rocks include Jusanori, Wakame Ne, and Yahiro Ne, with depths of 2.4m, 5.2m, and 12.8m, respectively.

Benten Hana (40˚13'N., 141˚50'E.), a high wooded point, lies 8 miles SSE of Yagi Ko.

A semi-circular cedar forest on a hilltop 3.8 miles NNW of Benten Hana is conspicuous.

2.7 **Kuji Wan** (Kuzi Ko) (40˚12'N., 141˚50'E.) is entered between Benten Hana and Mi Saki, 5 miles SSE. The bay, which is open to the ocean swell and has a rocky bottom, is not suitable for anchorage.

The outer breakwater, which extends NNW from the shore, is marked at its head by a light shown from a round tower, 12m high.

The N breakwater extends 0.2 mile SE from a position 0.5 mile NW of the head of the outer breakwater. A light is shown at its head.

O-saku Ne and Ko-saku Ne, drying rocks lying 0.7 mile and 0.85 mile SSE, respectively, of Benten Hana, are illuminated by a light on Ushi Shima, a small cliffy islet, 63m high, close off Benten Hana.

Suwa Lower Region is a dredged port at the head of the bay. Suwa Lower Breakwater harbors the construction of a new quay. The channel to the anchorage has a least depth of 4.5m; depths within the anchorage range from 4.5 to 6m.

Mi Saki (40˚08'N., 141˚53'E.), the extremity of a bluff head-land rising steeply to an elevation of 181m, separates Kuji Wan from Noda Wan. Todo Iwa, 7.3m high, 0.5 mile E of Mi Saki, is the outermost rock of the rocks that front that head-land.

Noda Wan lies between Mi Saki and Kuro Saki, a point about 8 miles SSE. A light is shown about 2 miles SW of Mi Saki. A light is shown from Kuro Saki. With offshore winds, local vessels anchor, in 20m, in the N part of Noda Wan.

Caution.—Extensive fixed fish nets encumber the S sides of Kuji Wan and both sides of the entrance to Noda Wan.

2.8 **Benten Saki** (39˚57'N., 141˚58'E.) is a high headland faced with steep cliffs located 4 miles SSE of Ma Saki. A light is situated on Benten Saki.

Shimanokoshi (Shimanokosu) (39˚55'N., 141˚57'E.), situated 2 miles SSW of Benten Saki, is a small fishing harbor protected by breakwaters. A light is shown from the E break-water.

Myojin Saki (Myojin Hana), about 9 miles SSE of Shim-anokoshi, is a cape of thickly wooded precipices, 101m high, and easily recognized from the N or S; it is a good radar mark. The 5m curve lies 0.5 mile E of this point.

Ma Saki (39˚45'N., 142˚00'E.) is a steep, pine-forested cape located 1.5 miles S of Myojin Saki. When viewed from the sea, the cape appears as an island.

Taro (Tanishi), a small breakwater-protected fishing harbor, is situated 2 miles SW of Ma Saki. A light is shown from the W breakwater at Taro.

Miyako Wan is entered between Anega Saki, 2.8 miles S of Taro, and Hei Saki, about 2.5 miles SE. The bay extends about 5 miles SSW. A light is shown in the bay. The W shore of the bay is somewhat irregular; at about the middle of it is the mouth of Hei Gawa (Hei Kawa). Its E shore is straight and cliffy. Hide Shima, 50m high, lies 0.3 mile offshore, 1 mile S of Anega Saki.

Miyako Ko (39˚38'N., 141˚59'E.)

World Port Index No. 61290

2.9 Miyako Ko lies on both the N and S side of the mouth of the Hei Gawa on the W shore of Miyako Wan, about 2 miles within the entrance. The harbor is built on reclaimed land and is protected by breakwaters. Vessels up to 20,000 dwt, with a maximum length of 240m and a draft of 12m, can be accom-modated.

Winds—Weather.—Because the bay is open NE, heavy winds are frequent, especially during the spring and autumn equinox. SW to W winds prevail throughout the year, with a strong NE wind blowing in winter. In the summer, a N wind blows during the day, and an onshore wind blows at night.

Depths—Limitations.—The water of the bay is generally deep, gradually shallowing from 75m in the middle of the bay entrance toward the head of the bay. The 10m curve extends to the breakwater.

Desaki Wharf No. 1 and Desaki Wharf No. 2 have a length of 214m, with a depth alongside of 7.3m. Desaki Wharf No. 3 is 175m long, with a depth of 9m.

Fujiwara Wharf No. 1 and Fujiwara Wharf No. 2 are 260m long, with a depth of 7.5m. Fujiwara Wharf No. 3 is 240m, with a depth of 12m. Fujiwara Wharf No. 4 is 180m long, with a depth alongside 4.5m. Fujiwara Wharf No. 5 and Fujiwara Wharf No. 6 are 130m in length, with a depth alongside both 7.5m. Fujiwara Wharf No. 7 is 180m, with a depth alongside 10m. Hitachi-hama is 120m in length, with a depth alongside 4.5m.

Kuwagasaki is 397m long, with a depth of 5m. A mooring buoy, about 1 mile S of the mouth of Hei Gawa, will accommodate a vessel of 10,000 grt, with a draft up to 9m.

Aspect.—Gas San (Gassan), on the E side of the bay, 2.3 miles SSW of Hei Saki, appears as a sharp peak from NE and SE. It is surmounted by three television towers. These towers can sometimes be seen when the coast is enveloped by fog. A tall chimney, remarkable from the NE, is 246m high and stands 1.3 miles SW of the mouth of Hei Gawa.

Pilotage.—Pilots are available, but not compulsory; arrangements can be made at the master's request. The pilot boards around the quarantine anchorage 1.5 miles N of Heisaka Light.

Anchorage.—Anchorage is available ENE of the mouth of Hei Gawa, in depths of 12.8 to 16.4m.

Quarantine anchorage is situated 0.8 miles ESE of the rivers mouth. Depths at the anchorage range from 16 to 22m, with a bottom of mud and sand.

Caution.—From March to September, fish nets are laid in the vicinity of Tatega Saki, about 1 mile N of the mouth of Hei Gawa.

Miyako Ko to Kinkasan To

2.10 Between Hei Saki and Kinkasan To, 87 miles S, the irregular, mountainous shoreline is heavily indented by numerous bays and coves. In general, the coast is steep-to with deep water close inshore. Occasional islets, sunken rocks, and above-water rocks are found off the headlands and in the bays. The 200m line lies from 5 miles offshore in the N to 12 miles off in the S along this section of the coast. There are no isolated dangers more than 2.5 miles offshore, except in the vicinity of Onagawa Wan.

Hei Saki (39˚39'N., 142˚02'E.), the SE entrance point of Miyako Wan, is a rounded point faced with low cliffs; it appears black. Close off the point are some rocks lying above and below-water. A light, equipped with a ramark, is shown from the point.

Saku Ne, awash, lies 0.2 mile offshore, 5.3 miles SSE of Hei Saki, and a rock, that dries, lies 0.2 mile offshore about 1 mile farther SSE. A light is shown in position 39˚36'N, 142˚02'E and also in position 39˚34.5'N, 142˚02'E.

Todoga Saki (39˚33'N., 142˚05'E.), the E extremity of Honshu, is a steep-to point faced with low cliffs and backed by Todo Yama, 465m high, rising close W of the cape. From N and S, Todo Yama appears as a sharp peak; from NE and SE, four peaks in a row are visible. The lighthouse on Todoga Saki is sometimes difficult to distinguish against the background when approaching from the N.

Ne Saki (39˚31'N., 142˚04'E.), located 1.75 miles SSW of Todo Saki, is the S extremity of a small peninsula which is faced with cliffs. From the NE, the point is a good landmark.

2.11 Yamada Ko (39˚28'N., 141˚58'E.) (World Port Index No. 61300) is a small, land-locked fishing harbor, lying at the head of Yamada Wan, which is entered between Ne Saki and Konega Saki (Kone Saki), 2.25 miles S.

The town of Yamada is located on the W shore of the bay and a breakwater-protected pier is situated at Osawa in the N part of the bay, within the harbor limits of Yamada Ko.

A light is shown from Kasano Hana and lights are shown at the heads at the E and W breakwaters at Osawa Ko. The S breakwater off Yamada is marked by a light as the breakwater heads are at Orikasa and Oura.

Tides—Currents.—The tidal currents in the bay do not exceed 0.5 knot. Off the entrance to the bay, the ocean current sets S at 1 knot, but may attain a velocity up to 3 knots when strengthened by the tidal current.

Depths—Limitations.—O Ne, an isolated 5m rocky depth located 1.25 miles SE of Ne Saki, obstructs the approach to Yamada Wan. There are general depths of over 37m from the sea to inside Yamada Ko harbor limits.

There are set nets and breeding grounds at many places in the bay.

Anchorage.—Yamada Wan affords sheltered anchorage, good holding ground, mud bottom. In the spring, heavy W squalls off the mountains may set up a rough sea in the anchorage. At Osawa Gyoko, sheltered anchorage during NW winds is advised for large and average-sized craft. During E to S winds, anchorage can be taken at Oura Gyoko; at the downtown Yamada frontag, anchorage can be taken during S to NW winds.

2.12 Konega Saki (Kone Saki) (39˚29'N., 142˚03'E.), the S entrance point to Yamada Wan, is cliffy, wooded, and 119m high; it is fringed with rocks extending a short distance offshore. When the summit is enveloped in fog, this point can be identified from the E by a remarkable triangular rock, 5.2m high, lying close inshore.

Karoga Dake (Karoga Take) is a prominent hill which attains an elevation of 504m, 1.25 miles SW of Konega Saki.

Okama Saki is a steep point located about 3.5 miles S of Konega Saki.

O Shima (39˚24'N., 142˚00'E.), with a height of 57m, is located 0.25 mile offshore about 2.5 miles SW of Okama Saki. Benten Shima, 64m high, a prominent landmark covered with trees, is located about 1 mile NW of O Shima. Lights are shown from O Shima and Benten Shima.

Funakoshi Wan (39˚23'N., 141˚58'E.), open to the E, is entered between O Shima and No Shima, 1.75 miles SW. There is a bight at the S and N ends of the bay. There is good anchorage, in 36m, at the head of the bay, where Funakoshi Gyoko is situated.

Fukuura Wan, directly S of Funakoshi Wan, is protected on all sides by surrounding mountains. Clear of dangers and having depths of 15 to 70m, this harbor serves as an excellent anchorage in any season. At the head of the bay is Fukuura Gyoko, having a breakwater with a lighthouse at its outer end.

No Shima lies on a spit extending about 0.35 mile NE from No Shima Saki.

2.13 Otsuchi Wan (39˚21'N., 141˚57'E.) is entered between No Shima Saki and Ohako Saki, 2 miles SE; the bay is

surrounded by mountains. The depth is over 73m between the entrance points, and the 20m line lies about 0.8 mile offshore in the head of the bay. Vessels anchor, in 14.6m, mud, good holding ground off Otsuchi, a fishing center in the NW section of the bay.

The bay supports a large number of seaweed and oyster farms situated throughout its S part.

Ohako Saki (39˚21'N., 142˚00'E.), the S entrance point of Otsuchi Wan, has a rock with a depth of 4.6m, located about 137m N of it. O Ne, not to be confused with a rock of the same name 10 miles northward, has a depth of 9.5m, and is located about 2 miles E of Ohako Saki. Strong oscillatory waves, with complex tidal currents, have been reported E of Ohako Saki.

Abumi Saki, a conspicuous white cliff, is located 2 miles SSE of Ohako Saki.

Sangan Shima, a wooded island, 133m high, lies 0.6 mile S of Abumi Saki.

Ryoishi Wan (39˚18'N., 141˚56'E.) lies between Abumi Saki and Mada Saki, 3.75 miles SSW. The exposed bay is open to the E and is unsuitable for anchorage. Naka Ne, a drying rock, obstructs the middle of the inner part of the bay. Asa Ne, an isolated rocky depth of 2.7m, lies 1.2 miles ENE of Mada Saki.

Kamaishi Ko (39˚16'N., 141˚54'E.)

World Port Index No. 61310

2.14 Kamaishi Ko is situated in the NW arm of two arms that lie at the head of Kamaishi Wan. Kamaishi Wan is entered between Mada Saki and O Saki, 2.25 miles SE. The port is a fishing center and is heavily congested during the fishing season (September-January). This port is protected from winds and waves, being surrounded by mountains on the S, W, and N. Waves entering the harbor during E and NE winds may affect mooring.

Depths—Limitations.—There are depths of 33 to 79m in the approach from the sea to the quarantine anchorage E of Kamaga Saki.

Yakushi Dashi, a sunken rock, lies 0.2 mile offshore S of Mada Saki. A wave meter is situated approximately 0.4 mile ESE of Mada Saki Light, and a submarine cable from that point WNW to the coast. Foul ground extends up to 0.3 mile seaward along the S shore of Kamaishi Wan.

Minami Naka Ne and Kita Naka Ne, rocky depths of less than 1m, lie in the middle of the harbor area. The channel has a depth of 14m. A light is shown from Minami Naka Ne.

A breakwater, surrounded by a restricted entry area best seen on the chart, is located in the entrance to Kamaishi Wan.

Vessels having a capacity of 160,000 dwt may berth at the 288m pier which has an alongside depth of 14m. Smaller vessels may dock at berths having alongside depths of 7.5 to 11.5m.

A detached breakwater has been constructed to protect a reclaimed area where harbor development is taking place on the N shore of Kamaishi Ko, between Washinosu Saki and Konawa Saki, 0.4 mile W.

A detached breakwater 800m in length has been constructed across the entrance to Kamaishi Wan between Madaga Saki and toward Techigane Shima. It has been reported (1998) the detached breakwater is surrounded by a restricted area best seen on the chart.

Aspect.—Goyo San (39˚12'N., 141˚44'E.), 1,341m high, rises 8 miles inland WSW of Kamaishi Ko. A westbound vessel has reported being able to recognize it from a distance of 55 miles.

Pilotage.—Pilotage is not compulsory. Pilots ordinarily board at the quarantine anchorage, but they are also available 1 mile NNE of O Saki Light. Pilots may be arranged for after dark and there are no restrictions on times of arrival or departure.

Anchorage.—Vessels of less than 2,000 grt usually anchor NW of Minami Naka Ne, in 20m, mud and sand, good holding ground. Larger vessels anchor NE of Minami Naka Ne and at the quarantine anchorage.

Quarantine anchorage is situated about 0.3 mile E of Kamaga Saki.

There are depths of 31 to 43m at the discharging anchorage.

Caution.—Numerous fish traps are often moored in the vicinity of Kamaishi Ko. Dense fog prevails from the end of May to mid-July.

A prohibited area, marked by lighted buoys, is located in the entrance to Kamaishi Wan.

2.15 O Saki (39˚15'N., 141˚58'E.) is the extremity of a narrow, wooded peninsula which appears black. There is a rounded hill on the peninsula, close within the point, 159m high, that is prominent. Kashiwagi Shima, 51m high, lies about 183m offshore, 0.25 mile SSW of O Saki Light. An isolated depth of 4.5m lies about 0.4 mile SE of O Saki Light. Reference should be made to the chart for the locations of numerous rocks and reefs close off O Saki.

One Saki, the N entrance point of Toni Wan, lies 2 miles SSW of O Saki.

Shikotsu Saki (39˚11'N., 141˚56'E.), a barren headland faced with gray cliffs, separates Toni Wan on the N from Yoshihama Wan to the S. Shoal water extends 0.5 mile ENE from the point and there is a rock islet. Hiru Shima, on this reef, has several trees on its summit and a lighthouse.

Yoshihama Wan, entered between Shikotsu Saki and Kobe Saki, 4.5 miles S, is open to the E. Anchorage is possible in Yoshihama Wan, but only in W winds.

Kobe Saki (39˚06'N., 141˚55'E.), a prominent high cape, is backed by Soto Yama, 445m high. Oshio Saki lies 2.25 miles SW of Kobe Saki.

Okkirai Wan is entered between Oshio Saki and Sune Saki, 1.25 miles S. Sakihama, a fishing harbor, is situated on the N shore of the bay. Okkirai Wan affords the best shelter from O Saki to Ryori Saki, but it is vulnerable to heavy swells, and local knowledge is necessary.

2.16 Sune Saki (39˚04'N., 141˚53'E.) rises sheerly from the sea in high, steep cliffs. A peak, with a height of 254m, is located 0.5 mile inland, W of the point. Ryori Wan is entered between Sune Saki and Ryori Misaki, 2.5 miles SSW. Ryori Misaki is faced with low cliffs. Naka Ne, with a depth of 8.2m, lies 0.2 mile E of Ryori Misaki; another rock, with a depth of 9.9m, lies 0.3 mile S of Naka Ne. Ryori Misaki Light is shown from a white square tower. A radar beacon transmits from a position 0.5 mile W of the light structure.

Kokuro Saki is located 2.5 miles W of Ryori Misaki. A rock, with a depth of 5.5m, lies 0.6 mile SE of the point.

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Ryori (Minato Ko) (39˚02'N., 141˚48'E.), a small fishing harbor, lies at the head of a small bay N of Kokuro Saki.

Koori Saki, the N entrance point to Ofunato Wan, is located about 2 miles WSW of Kokuro Saki. There is a light on this point. Several rocks are charted N of a line between these two points. A ridge extends 0.6 mile SE from Koori Saki. On this ridge are reefs such as Okinoka-miojin Dashi, 5.9m deep, and Ohira Iso, rocky and 3.2m deep.

Ofunato (39˚03'N., 141˚44'E.)

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2.17 Ofunato (Ohunato), an industrial and fishing center, lies at the center, near the head of Ofunato Wan, a narrow inlet which extends inland about 4 miles in a general N direction. The approach is marked by a lighted buoy in position 39˚01'N, 141˚47'E. The bay is entered between Koori Saki on the N, and Goishi Saki, 2 miles SSW. The harbor limits are those waters W of a line drawn between these two points. Breakwaters, about 1.3 miles W of the harbor limits, protect the entrance to the harbor.

Winds—Weather.—High, wooded mountains protect the landlocked port area; however, sudden gusty squalls blow down the inland slopes and strong NW winds sometimes blow.

Depths—Limitations.—There are depths in excess of 20m in the fairway from the sea to the anchorage off the port area at the head of the bay, except at the entrance between the breakwaters, where the controlling depth is 14.6m. Between the breakwaters the channel is 200m wide. The channel to the W of Sango Shima, in the middle of the harbor, is 28 to 39m deep, and the channel to the E of the island is 11 to 19m deep. There are depths alongside the piers from 4.5 to 9m. The main commercial wharf, a 10,000 ton Quay, lies at the NW head of the harbor; it has a length of 330m and depths of 8 to 9m along its face. Port limitations for tankers at Kamei Oil Pier are 35,000 dwt, a length of 220m, and a draft of 11m. Large tankers should moor at the mooring buoy 180m SE of the pier and unload through the available pipelines. The largest tanker ever to moor here was 51,000 dwt. There are three mooring buoys for tankers up to 15,000 dwt NW of Biwa Shima, with depths alongside of about 20m. The draft of log and coke carriers is restricted to 8m.

Pilotage.—Pilotage is not compulsory, but is advisable because of fishing obstructions in the harbor. Pilots board vessels, in daylight hours only, as follows:

1. Vessels over 5,000 grt—In position 39˚00.3'N, 114˚45.3'E.
2. Vessels under 5,000 grt—In position 39˚00.6'N, 141˚44.7'E.

Anchorage.—The quarantine anchorage is charted about 0.8 mile WSW of Koori Saki on the N side of the entrance range. There is anchorage off the port area in 10.9 to 18.3m, mud, poor holding ground. Sudden squalls blowing off the mountains may cause vessels to drag anchor.

Caution.—Numerous fixed fish nets and oyster beds are situated throughout the bay.

Approaching Ofunato Wan from the E, care should be taken to avoid the ridge extending 0.5 mile SE from Koori Saki, having reefs with a depth of 5.9m and the rock, Ohiri Iso, which dries.

There is a 14.8m depth 0.5 mile SW of O Saki. A tidal wave meter is situated 1 mile NNW of Benten Yama, with a cable extending from it E to the coast. Another wave meter and lighted buoy are situated 0.3 mile SW of the Koori Saki Light, with a submarine cable extending NNW to the coast. A submarine power cable runs W from Sango Shima's W shore to the coast.

2.18 Goishi Saki (38˚59'N., 141˚45'E.), the S entrance point of Ofunato Wan, is fronted by a cliff. Oashi Ne, a rock with a depth of 4.6m, and Asa Ne, with a depth 5.8m, lie 0.5 mile E and ESE, respectively, of Goishi Saki. Asane Iso, a reef with above water rocks on it, extends 0.35 mile S of Goishi Saki; the reef is usually marked by breakers. A light is shown from Goishi Saki.

Kuro Saki is situated 2 miles SSW of Goishi Saki; between them, from the N to S, lie Kadonohama Wan, Tadaide, and Ono Wan. The first and last of these are exposed SE and are unsuitable for anchorage. Tadaide is a small fishing port and is only available for small craft with local knowledge.

Hirota Saki (38˚56'N., 141˚42'E.), the E entrance point of Hirota Wan, is located 1.25 miles SW of Kuro Saki. The point is fringed with numerous islets and above-water and sunken rocks. Tsubaki Shima, a round-topped, light yellow-colored islet, surmounted by dwarf trees, is 40m high; it lies near the extremity of the foul ground extending SE from Hirota Saki. There is a light on the N side of this islet.

A rock, which dries, 1m lies 0.13 mile S of Tsubaki Shima, and Okiakairoku Ne, with a depth of 9.1m, lies 0.2 mile SE of the islet.

2.19 Hirota Wan (38˚58'N., 141˚40'E.), entered between Hirota Saki and O Saki (Karakuwa Saki), 5 miles S, recedes about 6 miles inland in a NNW direction, terminating in a sandy beach marked by breakers. The other shores are, in general, cliffy and fringed with sunken rocks.

Tomari, a small fishing village, is situated on the E shore of the bay, 1 mile NNW of Hirota Saki. Osabe Ko, also a fishing harbor, is situated on the NW shore of the bay, near its head.

Anchorage.—Anchorage is available, in 18.3m, 1.25 miles from the head of the bay, mud and sand, good holding ground. The bay is open from the S through E and there is usually a swell off the head of the bay even with offshore winds.

Numerous fixed fish nets, oyster beds, and seaweed nurseries are situated throughout Hirota Wan.

Hakone Yama (39˚01'N., 141˚42'E.), 447m high, located 4.75 miles NNW of Hirota Saki, and Hinokami Yama, 875m high, rising 3 miles farther NNW, provide good landmarks to vessels making Ofunato Wan and Hirota Wan.

O Saki (38˚51'N., 141˚41'E.) is faced with steep cliffs. Kooki Iwa, an isolated rock 12m high, lies 137m SE of the point.

2.20 Kesennuma Wan (38˚51'N., 141˚38'E.) is entered between O Saki and Iwai Saki, 2.75 miles SW. The center of the bay is divided into two parts by O Shima, which is 3.25 miles long in a N to S direction, and is 1.5 miles wide near its

N end. To Wan lies on the E side of O Shima and Sei Wan lies on the W side of the island.

To Wan, the E bay, leads N into Oshima Seto, the narrow channel between O Shima and the mainland. Vessels of less than 1,000 grt generally use this bay, which has a least depth in the fairway of 20.1m. An overhead cable, with a vertical clearance of 26m, spans the W end of Oshima Seto. Kara Shima, surrounded by shoal water, rises to a height of 25m, 1.5 miles WNW of O Saki. The E shore of To Wan is jagged and from each projection rocks including Naka Ne, Nakataira Ne, and Aka Iso extend 0.1 to 0.2 mile offshore. A light is shown from Naka Ne.

Sei Wan, the W bay, has a least depth of 7.3m in the buoyed fairway to the head of the bay. There is a reclaimed area at the mouth of O Gawa, about 3.5 miles within the mouth of the bay. From the narrows N of the reclaimed area, a narrow dredged channel, with a depth of 5.1m, leads into Kanaega Ura.

Anchorage.—Anchorage in Sei Wan is impossible due to the oyster beds on each side of the fairway.

Sei Wan is crossed by submarine cables and pipelines 1.5 and 2.5 miles N, respectively, of Iwai Saki.

Caution.—The fairway to Sei Wan is narrow, and very careful shiphandling is necessary. The outer limits of the oyster beds on each side of the channel are marked in places by buoys, some of which show lights.

2.21 Kesennuma Ko (38˚52'N., 141˚36'E.) (World Port Index No. 61325), at the mouth of O Kawa, is a regulated, immigration, quarantine, and local port lying about 3 miles N of the Sei Wan entrance. The harbor limit line extends W from Ushi Kora to the opposite shore of Sei Wan. Kesennuma Gyoko lies N of Kesennuma Ko, and lines the W side of Kanaega Ura with fish landing quays.

Winds—Weather.—Summer winds are generally S; winter winds are generally NW.

Depths—Limitations.—The least depth in the fairway through Kesennuma Ko and Kanaega Ura is 5m, but the width of the fairway narrows to 100m SW of Hachiga Saki.

The commercial berths, comprised of private dolphin berths having alongside depths of 6m, with each having a length of 40m. The Asahi Wharf, on W side of Kesennuma Ko, has a length of 365m and a depth of 7.5m alongside.

Oyster beds lie on either side of the range line leading into Kesennuma Ko, extending up to 0.1 mile from the E shore, and up to 0.3 mile from the W shore of the bay.

An overhead cable spans the narrows at Hachiga Saki, with a vertical clearance of 38m, which has a channel width of about 100m at this point.

Pilotage.—Pilotage is not compulsory, but recommended. Pilots are available at Kamaiski during daylight hours only.

Anchorage.—Well-sheltered anchorage may be taken in Kanaega Ura, in depths of 5 to 9m, mud, good holding ground.

Both To Wan and Sei Wan are open to S seas and swell. Local vessels find anchorage in the coves along the E shore of To Wan, but there is no anchorage in Sei Wan, as the water outside the fairway is utilized for oyster beds.

The quarantine anchorage, a semi-circular area with a radius of about 0.3 mile, lies centered about 1.3 miles W of O Saki Light, in the entrance to To Wan.

Caution.—O Ne (38˚48'N., 141˚38'E.), an isolated rocky depth of 10m, obstructs the center of the approach fairway to Sei Wan; it lies 1.5 miles SE of Iwai Saki. Ashi Ne, with a depth of 4.9m, and Take Ne, with a depth of 6.7m, lie 0.85 mile WNW and 1.1 miles NW, respectively, of O Ne.

2.22 Iwai Saki (38˚49'N., 141˚36'E.), the W entrance point of Kesennuma Wan, is conspicuous. Foul ground extends 1.25 miles S of the light structure on the point. Mokko Ne (Maru Iso), with a rock on it which dries 0.9m, is the farthest S of these dangers.

Kurosaki Shima lies at the end of a rocky reef extending 0.3 mile SSE of Ryumau Saki Light. There is a depth of 10m about 0.2 mile SSE of Kurosaki Shima.

In the entrance waters to Sei Wan, between Iwai Saki and Ryumau Saki, within the 20m line, lie several rocky depths of 5.9, 8.7, 11.9, and 12.3m. Vessels should navigate this area with caution, and reference should be made to the chart.

Sueno Saki (38˚44'N., 141˚34'E.) lies 5.5 miles S of Iwai Saki. Koizumi Wan, an open bight, lies between these two points. Tomari (Utatsu) Saki, a low, flat, sparsely wooded, point which appears black when viewed from a distance, is located 3 miles S of Sueno Saki. A light is shown on the point.

Shizukawa, a small fishing harbor, is situated in a cove at the head of Shizukawa Wan. Local vessels anchor off the town. Shizukawa Wan, whose coast is indented by numerous small coves, is entered between Tomari Saki and Kamiwari Saki, 3.5 miles SSW.

2.23 Osashi Saki (38˚36'N., 141˚32'E.) lies 2 miles S of Kamiwari Saki. Foul ground, comprised of sunken rocks and islets, extends up to 1.5 miles offshore between these two points. Oppa Wan, entered close S of Osashi Saki, is open to the E. The coves on the S shore of the bay are suitable for anchoring small vessels, with local knowledge.

Osu Saki lies S of Oppa Wan, about 6.8 miles SSE of Osashi Saki.

Ogatsu Wan (Okachi Wan) is entered between Shirogane Saki (Shirokane Saki), which lies 2 miles S of Osu Saki, and Izu Shima (Isu Shima), which lies 2 miles farther S. Shoal water extends 0.5 mile N from Izu Shima into Ogatsu Wan, and O Nabakari (Onahari Ne), a rock, 6.7m high, lies in the fairway 0.25 mile farther NNE. Ogatsu (Okachi), a small fishing harbor, lies at the NW extremity of Ogatsu Wan.

Izu Shima (38˚27'N., 141˚32'E.) is a wooded island, 88m high, fringed with above-water and sunken rocks. A light stands on the S shore of this island. O Ne, a rocky depth of 6.7m, lies 2 miles offshore E of Izu Shima.

Onagawa Wan is entered between Izu Shima and Haya Saki, 2.25 miles to the S. A submarine pipeline is laid between Izu Shima and Ino Shima.

Onagawa (38˚27'N., 141˚27'E.)

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2.24 This small commercial port and fishing center is situated at the NW extremity of Onagawa Wan. The dock area lies off the town and is protected by breakwaters that project

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from the N and S shores, about 1 mile E of Onagawa. Lights are shown from the breakwater heads.

Winds—Weather.—The prevailing winds are from the S in summer, NW in winter, and SE during spring and autumn.

Tides—Currents.—Tidal currents may attain a rate of 1 knot in the approaches to the outer bay.

Depths—Limitations.—There are depths in excess of 27m in the channel from the sea to the breakwaters, where there is a fairway width of about 146m, with a depth of 15m between the heads of the breakwaters. General depths off the dock area range from 5 to 20m.

Vessels of 3,000 grt berth alongside.

There is a wharf 155m long, 0.5 mile NW of the root of the S breakwater.

Anchorage.—Local coasting vessels anchor within the breakwaters. Small vessels anchor within the S arm of Onagawa Wan and are protected from S winds, but the holding ground is poor.

Caution.—Fixed fish nets fringe the shores of the bay, and the inner harbor is encumbered by oyster beds.

2.25 **Haya Saki** (38˚24'N., 141˚32'E.) is the S entrance point of Onagawa Wan. A rounded hill, 154m high, rises about 0.8 mile SW of Haya Saki. The hill is wooded and appears black; it is prominent.

Onagawa Nuclear Power Station, at which there is a chimney about 178m high, is situated about 1.8 miles W of Haya Saki. A light is shown from the breakwater head of a harbor serving the power station. Several lighted buoys are moored about 1.5 miles WNW of Haya Saki.

Enoshima Retto, a group of islets and rocks, extends 4 miles E from Haya Saki. Kasagai Shima (Kasugai Shima), 45m high, the N island, appears pointed when seen from the E and rounded from the other directions. Eno Shima, the largest island of the group, is 77m high. Foul ground extends 0.5 mile E of the island and isolated rocky depths of 2.3 and 8.2m lie 0.6 and 1.5 miles ENE, respectively, of the light structure on the island. Asha Shima, 6m high, rocky, and whitish in appearance, is the S island. Foul ground, with above-water rocks on it, extends about 0.4 mile SW from the island. Other islands and above and below-water rocks lie within this group.

Hayasaki Suido, the channel that lies between Haya Saki and Enoshima Retto, has a depth of 40m in the fairway, which has a width of 0.25 mile. The channel is used by coastwise shipping.

Two submarine cables run from Haya Saki to Eno Shima. A submarine pipeline lies between Izu Shima and Eno Shima.

Yorii Saki, fronted by foul ground to a distance of about 0.3 mile, lies 0.85 mile S of Haya Saki. Samenoura (Sameura) Wan, entered SW of Yorii Saki, is exposed E, and even light onshore winds send in a heavy sea.

Kuro Saki (38˚16'N., 141˚32'E.) is the S extremity of Oshika Hanto. This point lies 6 miles S of Samenoura Wan. A light is shown from Kuro Saki.

Kinkasan To (38˚17'N., 141˚34'E.), whose S extremity lies 2.75 miles E of Kuro Saki, rises to a height of 445m. The peak of the island is conical and wooded; it has been reported to be visible at a distance of 50 miles. A lighthouse, radiobeacon, and radar beacon are situated on the SE point of Kinkasan at Awabiare Saki. Kinkasan Seto, between Kinkasan To and the mainland, has a depth of 5m and a navigable width of 293m at its narrowest point. The channel is used by local coasting vessels.

A submarine cable is laid across Shishi Watashi. An overhead cable, with a vertical clearance of 29m, spans the channel 0.2 mile farther N.

Kinkasan To to Shioya Misaki

2.26 The 80-mile stretch of coast from Kinkasan To to Shioya Misaki includes Ishinomaki Wan and Matsushima Wan in the N part and includes numerous islands. In the 77 miles from the entrance of Matsushima Wan to Shioya Misaki, the shoreline is low and marshy with sandy beaches in the northern half, and low cliffs and sandy beaches comprise the shore in the southern half.

The 10m line lies 0.5 to 1 mile offshore and the 20m line 2 to 4 miles offshore. There are no isolated dangers, except in the vicinity of Unoo Saki.

Winds—Weather.—At Shioya Misaki, summer winds ranging from NE to SE usually are followed by rain; whereas, S winds that are weak contribute to good weather. A westerly will sometimes blow after a rain, but then will change direction soon after. N winter winds frequently bring snow, but rains come with Northeasterlies or Easterlies. There are many foggy days from May through September, especially during the rainy season.

Tides—Currents.—The flood current sets W and the ebb current sets E, on a line from Kinkasan To to Shioya Misaki, reversing direction at the times of H and LW. Their velocities seldom exceed 0.5 knot.

Off Shioya Misaki the flood current is to the WNW, and the ebb current is to the ESE, changing directions about the times of H and LW Their velocities are less than 0.5 knot. However, when the declination of the moon is the greatest, the tides are affected by diurnal tidal currents and directions and velocities of the currents become complicated.

2.27 **Ishinomaki Wan** (Isinomaki Wan) (38˚20'N., 141˚20'E.) lies between Kuro Saki (38˚16'N., 141˚32'E.) on the E, and Kayano Saki, 21 miles to the W. The E shore of the bay is irregular, with the islands Azi Shima (Aji Shima) and Tasiro Shima (Tashiro Shima) lying at the SE end of the bay. Sandy beaches line the N shore, the SW shore is mostly steep cliffs, fringed with rocks and reefs.

On the E side of Ishinomaki Wan the 10m line lies close to the coast, and on the N from 0.5 to 1 mile off. There are isolated depths of less than 10m, 1.25 miles off the W coast.

Caution.—There are numerous fish havens in the S approach to the bay. Their locations may best be seen on the chart.

Azi Shima (38˚15'N., 141˚29'E.), 101m high, lies 1.5 miles offshore and 1.5 miles W of Kuro Saki. The island is flat, but is a good landmark. A light is shown from the SE point of Azi Shima. Several submarine cables lie between the N shore of this island and the mainland. A submarine pipeline runs from the N coast, NE to the mainland. Miyagasane Sho, a rocky patch with a least depth of 6.8m, lies 1.5 miles SW of the island's W extremity.

Tasiro Shima rises to a height of 96m in its N part. This island lies 1.5 miles offshore about 1.5 miles NW of Azi Shima. Pine trees grow on a hill near Naginoma Saki, the SE extremity of the island. Nigishiro Saki Light is shown near the N extremity of the island. A light is shown on the NE coast between four submarine pipelines running to the mainland. Another submarine pipeline runs from the SE end of the island to the mainland.

A channel between Azi Shima and Tasiro Shima, on the SW and the mainland on the NE, provides a heavily-traveled short-cut for small vessels from Kinkasan Suido to the ports in the N part of Ishinomaki Wan.

2.28 Ayukawahama (38˚18'N., 141˚31'E.) is a whaling station, protected by a breakwater, situated at the head of Ayukawa Wan. Ayukawa Wan is entered 1.25 miles NW of Kuro Saki. There is a light at the head of the breakwater off Ayukawahama. Azi Shima and Tasiro Shima protect the harbor from offshore winds; however, in strong SE winds, waves are deflected from Azi Shima and enter the bay.

Anchorage.—Ayukawa Wan affords good anchorage for large vessels, in a depth of about 20m, sheltered by the off-lying island, except during strong SE winds, which send a heavy sea into the bay.

Kugunarihama Wan, located W of Ayukawa Wan, is protected by Azi Shima and Tasiro Shima, especially in NW winds. The bay provides good anchorage, in depths of 10 to 16m. Caution is required when anchoring to avoid the submarine cables and water pipelines.

Ohara Wan opens WSW and has three coves at its head. Usagi Shima, 34m high, in the S entrance of the bay, lies 1.25 miles NW of Kugunarihama Wan, and Kimaga Ne, which dries 0.9m, and a rocky patch, with a depth of 4.7m, lie off the N entrance of Ohara Wan, 1.75 miles NNW of Usagi Shima. Vessels over 1,000 grt, with local knowledge, may anchor in Ohara Wan, with Hitoisi Yama, a wooded sharp peak 293m high, located 2.25 miles ENE of Usagi Shima, bearing between 080˚ and 090˚.

Caution.—Numerous oyster and seaweed cultivation grounds lie inside the bay.

2.29 Oginohama Ko (38˚22'N., 141˚27'E.), a fishing harbor, is the SE of four coves at the head of Oginohama Wan, which is situated N of Ohara Wan. Oginohama Wan has depths of 11 to 15m, mud bottom, and provides anchorage in all but S to W winds. There are many oyster beds within the bay and Oginohama Ko is used as an oyster cultivation area; entry to the port is difficult without local knowledge. A light is shown from a concrete tower on Kitsuneana Saki, the N entrance point of Oginohama Ko.

Watanoha (38˚25'N., 141˚22'E.), a fishing center protected by breakwaters, is situated at the NE end of Ishinomaki Wan, NW of Oginohama Wan. Lights are shown from the E and W breakwaters.

Ishinomaki Gyoko is situated 1.5 miles W of Watanoha. The harbor, which is protected by breakwaters, has quays with depths of 6.1m alongside.

A detached breakwater extends 0.3 mile E and ESE from a position 0.2 mile SSW of the head of W breakwater. A light is shown from its E end. This breakwater sometimes covers at HW.

Three short detached breakwaters lie close off and parallel to the coast from near the root of the W breakwater to 0.2 mile W.

Ishinomaki Ko (Isinomaki Ko) (38˚24'N., 141˚19'E.)

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2.30 Ishinomaki Ko is a fishing center at the mouth of Kitakami Gawa. Breakwaters protect the channel entrance leading to the berths along the banks of the river.

The new commercial port is situated 2 miles W of the fishing harbor. A breakwater extends about 0.9 mile SSW from the E side of the new harbor entrance leading to the turning basin and dock area. Lights are shown on each side of the entrance.

Hibarino Breakwater extends 0.9 mile SSW from the E side of the harbor entrance. A light is shown at the head of this breakwater. An area in which navigation and fishing are prohibited extends 0.5 mile SE, 1.4 miles ESE, and 0.8 mile NE of Hibarino Breakwater Light.

Three short detached breakwaters lie close off and parallel to the coast from near the breakwater on the W side of the entrance to about 0.8 mile WSW.

Another detached breakwater, about 0.3 mile long, lies on a NNE/SSW axis, 0.8 mile SE of Hibarino Breakwater head.

Winds—Weather.—Winds out of the NW prevail from September to April; the rest of the year SE winds predominate.

Tides—Currents.—Tidal currents off the harbor set NE on a rising tide and SW on a falling tide.

Depths—Limitations.—The depths in the waterway at the mouth of Kitakama Gawa are approximately 4m. The river depths fluctuate greatly after heavy precipitation. Vessels up to 1,000 grt berth within the harbor on the W bank of the river.

At the industrial area, there is a channel between the breakwaters dredged to a depth of 10m for a width of 200m. The berths within the harbor have depths of 4.5 to 10m and will accommodate vessels of 15,000 dwt in depths of 10m.

Aspect.—Maki Yama, a wooded peak 219m high, located 2.25 miles NE of the mouth of Kitakami Gawa, is a good mark. The E and W breakwaters to the Kitakama Gawa entrance are good radar targets. A light is shown from each breakwater. There are various tanks and chimneys charted in the port area. The tallest chimney is painted red and white, the other are painted grey.

The Hiyori Bridge, at the mouth of the Kyu Kitakami Gawa, approximately 17m in higth shows red and yellow lights.

Pilotage.—Pilotage is not compulsory, but it is advisable from sunrise to sunset. Pilots embark about 1 mile S of the entrance to the commercial port in the vicinity of the quarantine anchorage, except in rough weather, when special arrangements will be made with the vessel concerned.

Caution is required as there may be fishing nets in the vicinity of the pilot boarding position.

Anchorage.—A rectangular quarantine anchorage is centered 2 miles SW of the mouth of the Kitakami Gawa. Two areas in which entry is prohibited are situated between the quarantine anchorage and the head of Hibarino Breakwater. Vessels should refer to the chart, as hard materials are on some

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areas of the sea bottom and these areas are a suspected menace to anchoring.

A sunken ship lies 9.8m below the surface 1 mile SSW of the West Breakwater Light of Kitakami Gawa. Wrecks also lie 2 miles SW and 2.8 miles WSW of the West Breakwater Light, with depths of 9.8m and 12.4m, respectively.

Nobiru Wan is situated in the NW corner of Ishinomaki Wan, about 7 miles WSW of Ishinomaki Ko. The bay is entered between the mouth of Naruse Gawa and Yoroi Ne, 1.5 miles SSE.

2.31 **Yoroi Ne** (38˚21'N., 141˚11'E.), above-water, is the NE of the numerous rocks and shoals which fringe the E coast of Miyato Shima.

Miyato Shima (38˚20'N., 141˚10'E.) lies in the W part of Ishinomaki Wan and is the largest of a number of islands that lie on the NE side of the approach to Shiogama Ko. Kayano Saki is the SE extremity of the island. Ha Shima is located 0.4 mile SE of this point. This island is marked by a lighthouse and has many off-lying rocks.

Matsushima Wan (38˚20'N., 141˚05'E.) is entered between Kayano Saki and Hanabuchi (Hanabuti) Saki, 4.5 miles WSW. Most of the bay is shoal and the land in the vicinity is comparatively low. The bay is fronted by a group of islands and the irregular shoreline is fringed with numerous rocks, obstructed fish havens, islets, and reefs up to 1.5 miles offshore. The entrance of the bay, which opens SE, is encumbered with off-lying rocks and reefs.

Off-lying dangers.—Jinotaka Ne, Naka Ne and **Okinotaka Ne** (Okikajitaka Ne) (38˚17'N., 141˚09'E.) are isolated rocky depths, with least depths of 2.7m, which lie 1 mile SE of the entrance to the dredged channel. O Ne, a rocky depth of 0.9m, lies 3.5 miles offshore about 2.5 miles SSE of the dredged channel entrance. Hashimano Ne, with a least depth of 12.8m, lies 1.4 miles W of O Ne.

A ridge runs 0.8 mile to the SSE, past Ki Shima and Kuro Shima, from Karato Shima at the N side of the harbor entrance. South of the ridge lies a reef called Horakake (Horagake) Ne, with a least depth of 3.6m. A lighted buoy is situated close S of Horakake Ne. Another ridge, with an outermost depth of 7.3m, extends 0.6 mile SW from Ki Shima.

Shiogama (38˚19'N., 141˚02'E.)

World Port Index No. 61350

2.32 Shiogama (Siogama), an important commercial port and fishing center, is a port of entry situated in the S part of Matushima Wan. The port is divided into two districts which are called the Shiogama district and the Sendai district. The Shiogama district is divided into four sections. The Sendai district is a dredged harbor situated 2.5 miles SW of Hanabuchi Saki, and has been developed as an industrial port.

Winds—Weather.—Winds blow mostly from the NW and the N between the months of September and April, with S and SE winds the rest of the year.

Tides—Currents.—Seaward of the outer district the tidal current sets NW with the rising tide and SE with the falling tide at a rate up to 1 knot. In Yogasaki Suido, the E current may attain a rate of over 2 knots, while the W current may have a rate of 2 knots.

Depths—Limitations.—The fairway, which is entered 2.5 miles WSW of Kayano Saki, has a dredged depth of 8.5m 8.5m over a width of 100m, although depths of as little as 7.5m extend into the N side of the channel between Zizo Shima and a point 0.2 mile further E; it has also been reported (1997) that depths of up to 3m less than charted may exist in the dredged channel. This channel, which is about 3.8 miles long, passes through Yogasaki Suido, between Mahanasi Shima on the N and the mainland on the S, then into the inner sections of Shiogama. A prohibited area lies close W of the entrance to the channel. In Shiogama, there are berths alongside that will accommodate a vessel up to 8.5m draft, a length of 170m, and of 18,000 dwt. Depths alongside the berths range from 4.5 to 9m.

A breakwater 20m wide, constructed close E of Kaki Shima and W of the Fish Market.

In the Sendai district, there is a dredged entrance channel and turning basin with a depth of 17m, although it has been reported (1997) that depths of up to 2m less than charted may exist in the dredged channel; farther within the harbor the depths are dredged from 7.5m to 12m. These berths will accommodate a vessel at the tanker berth, on the N side of the dredged area, with a draft of 17m and of 150,000 dwt.

Tanker terminals are available that can handle vessels up to 230,000 dwt and a 17m draft.

Aspect.—Ha Shima, a flat island 40m high, located 0.5 mile SE of Kayano Saki at the E end of the harbor entrance, is conspicuous with a lighthouse on the W end. Otaka Mori, a conical peak 106m high, rises 2 miles NW of Ha Shima. Hanabuti Saki, 4.75 miles WSW of Ha Shima, is a good mark, as are the three chimneys 1.25 miles NW of that point. Sukano Hana, (Sugano Hana,), a point 3 miles WNW of Ha Shima, and Tomi Yama, a conical hill 117m high, 4.5 miles NNW of Sukano Hana, serve as an entrance range for vessels approaching from the S.

In the Sendai district, there are two chimneys, 184m and 125m high, situated 2.5 miles SW of Hanabuchi Saki, that are prominent.

Pilotage.—Pilotage is not compulsory. Pilots are available during daylight hours only and embark between the Quarantine Anchorage and Shiogama Fairway Lighted Buoy. In bad weather, the pilot boards in the vicinity of Lighted Buoy No. 1; the pilot will embark there by arrangement. Vessels may arrive and depart at night.

In the Sendai district, pilots embark in the area S and E, respectively, of a line drawn 3 miles from Sendai Lighted Buoy A to the E, and a line drawn from the same buoy 3 miles to the S. For crude oil tankers, pilots embark in the quarantine anchorage W of Sendai Light.

Regulations.—In the Sendai district, priority of entry and departure is given to ferries. The movement of other vessels is restricted to the time of ferry schedules.

The entry of tankers is controlled by the oil refinery under the supervision of the harbormaster.

Anchorage.—Circular quarantine anchorages are centered 2 miles WSW of Ha Shima and 4.5 miles SSE of Hanabuchi Saki.

Anchorage is available in the outer section in a depth of 12m, sand and rock bottom. Anchorage is not suitable in inclement weather, no shelter is available, it is advisable for vessels to proceed offshore.

Caution.—Vessels in the vicinity of the quarantine anchorage should avoid the ridge extending from Ki Shima and the sunken rock, Kajikake Ne. Vessels should consult the charts for the dangers near the fairway outside Shiogama Ko. A wave height meter, marked by a lighted buoy, is situated 1.3 miles SE of the S Sendai Breakwater; a submarine cable runs from its site to the lighthouse. Another wave meter is situated 0.75 mile SW from this breakwater, with a submarine cable running from it to the shore.

2.33 Shiogama to Unoo Saki.—From Shiogama, the coast trends in a general S direction about 28 miles to Unoo Saki. This is a bow-shaped sandy beach; inland features are generally low and landmarks are rare.

The 10m line runs about 0.5 mile offshore; there are virtually no hazardous rocks except near Unoo Saki.

Ara Hama (38˚02'N., 140˚55'E.) is a fishing port near the mouth of the Abukuma Kawa, situated on the coast 18 miles SSW of Shiogama.

Soma Ko (37˚50'N., 140˚57'E.) is situated 12.5 miles S of Ara Hama and is protected by a S breakwater and a wharf breakwater.

No. 1 Wharf, 275m long, is situated 0.2 mile NW of the root of the S breakwater. There are depths of 4.8 to 8m alongside, and 6.3m in the approach to the wharf.

No. 2 Wharf is situated about 0.5 mile SW of the head of the S breakwater. There are depths from 5.2 to 7.6m alongside the S face of this wharf.

In 1987, a hole extending about 0.2 mile N from the N side of No. 2 Wharf was under construction.

Matsukawaura Gyoko, situated in the SE part of Soma Ko, is a fishing harbor entered W of Unoo Saki; it is suitable only for small craft with local knowledge.

Unoo Saki (37˚49'N., 141˚00'E.), close E of Matukawaura Ko, the E end of an isthmus, is a pine-covered point faced with cliffs of red earth. Obstructions are situated 4.75 miles NE and 5.75 miles E of Unoo Saki. Fish haven obstructions are situated 13 miles NNE and 10.75 miles E of Unoo Saki.

2.34 Unoo Saki to Shioya Misaki.—From Unoo Saki, the coast trends 50 miles S to Shioya Misaki, with no noticeable indentations, and consists of cliffed coasts with alternate stretches of sand and rock. The coast is backed by a plateau 46 to 183m high, with a range of mountains farther inland; the coast is without prominent peaks or points.

The 10m line lies 0.5 to 1 mile from the shore; there are rocky shoals in places that lie within 1 mile of the coast.

A prominent tower, 168m high, stands on the coast, 18.8 miles S of Unoo Saki. An oil exploration platform is situated in position 37˚17'49"N, 141˚27'47"E. A submarine pipeline is laid from the platform to the shore in position 37˚14'14"N, 141˚01'00"E.

Fukuura (37˚33'N., 141˚02'E.) is a small fishing harbor situated 16 miles S of the Unoo Saki. Uketo, another small fishing port, lies 4 miles S of Fukuura.

Huku Shima Daiiti (37˚25'N., 141˚02'E.), a nuclear power plant protected by breakwaters, is situated 3.8 miles S of Fukuura. Within the breakwaters there is a basin dredged to 6m. There is shelter here in an emergency. There is a light shown from the breakwater and several conspicuous chimneys close to the shore.

Hisanohama Ko lies 16.5 miles S of Huku Shima Daiiti and affords anchorage for small vessels and motor-powered sailing boats during winter W winds. The E half has been dredged to a depth of 5m. These waters are not calm during SE winds.

Yotsukura Ko (Yotukura Ko) (37˚06'N., 141˚00'E.), a small fishing port divided into three parts by wharves and breakwaters, is situated 19 miles S of Hukushima Daiiti. There are six lights shown from the breakwaters. A wave meter lies 0.8 mile SE from the S breakwater and a submarine cable runs from the wave meter NW to the shore. It is dangerous to enter the harbor during N and E winds, which cause large waves.

All basins have a tendency to become silted up with sand. Fish havens are situated 1.8 miles E and 2.5 miles ESE of Yotsukura Ko.

Shioya Misaki (Sioya Misaki) (37˚00'N., 140˚59'E.), 7 miles S of Yotsukura Ko, is 55m high. A reef extends SE from the cape for 1.5 miles to a rocky depth of 5.4m. There is a light on this cape.

Shioya Misaki to Inubo Saki

2.35 From Shioya Misakito Inubo Saki, this 77-mile stretch of coast is bow-shaped with few indentations. The area S of Oarai Misaki is mostly a straight sandy beach backed by wooded hills.

Generally, the 20m line lies 2 miles offshore, but it is irregular and extends seaward up to 3 miles in places There are several isolated depths of less than 20m seaward of the 20m line. Deep-draft vessels should sail with caution near O Ne, N of Inubo Saki.

Caution.—Cold and warm currents meet in the area 60 to 110 miles offshore, between Shioya Misaki and Inubo Saki, and generate whirlpools. Drifting wood, seaweed, and schools of fish are found here and may be mistaken for rocks or reefs.

2.36 Shioya Misaki to Oarai Misaki.—From Shioya Misaki to Otu (Otsu) Misaki, 13 miles SW, the coast is straight, except for Mi Saki, which extends out to form the E side of Onahama Wan.

Ena Ko (36˚58'N., 140˚58'E.), a small fishing harbor, is situated close SSW of Shioya Misaki and protected by breakwaters.

Two outer detached breakwaters lie 0.3 mile seaward of the harbor. A light is shown on the S head of the N of these breakwaters. A third detached breakwater lies nearly 183m ESE of this light. A fourth detached breakwater, 40m long, is situated 0.3 mile SE of the same light. Special traffic rules are in force in these two fishing harbors. Vessel should navigate anchor along this coast carefully, as many shoals are outside the 10m curve.

Depths—Limitations.—The shores of the basins are lined with quays. There are general depths of 3 to 6m, and a number of mooring buoys have been laid in each basin.

Guzubo, with a least depth of 1.6m over rock, lies 0.4 miles SE of Kasso Misaki (Gasso Misaki). Karakai Dasi, with a least depth of 6.5m over rock, lies 0.8 miles S of Kasso Misaki.

Onahama Wan (36˚55'N., 140˚52'E.), consisting of white cliffs on the shore, is located between Mi Saki and Ohama

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Hana, 4 miles SW. Onahama Ko lies in the NE part of the bay. Conspicuous yellow cliffs line the shore in the vicinity of Mi Saki. West of the harbor area, from Has Saki to Ohama Hana, the coast is backed by white cliffs.

Caution.—Fishing nets extend from 0.1 to 0.4 mile SE of Mi Saki from March to January. A number of fish havens have been established in the approaches to Onahama Ko.

Onahama Ko (36˚56'N., 140˚54'E.)

World Port Index No. 61355

2.37 Onahama Ko, an open port, is protected by a breakwater which projects SW from the shore; it is an important commercial harbor and fishing center.

Winds—Weather.—Prevailing winds in the area are W through N in winter, N during the spring and fall, and S in summer.

Locally, NE through SE winds in summer predict rain and S winds predict good weather. In winter, snow with a NW wind often changes to rain with the wind shifting to NE through E.

Frequent fogs begin in May; the foggiest month is July, with an average of ten days; there is a subsequent drop by September. Fogs here normally form offshore at night, and enter the harbor on a weak E to S wind by morning, dissipating with the rise of the sun and a N wind.

Tides—Currents.—Seaward of the breakwater the tidal currents set clockwise to the S with the rising tide and counterclockwise to the N with a falling tide; the rate of flow is 0.5 knot. The directional change occurs at about the times of the HW and LW. Within the breakwaters the currents are negligible. The maximum tidal range is 2.6m. The range of the tide is about 1.4m.

Depths—Limitations—The draft limit in the channel is 9.7m to the port, 13.5m to the tanker sea berth, and 12.3m to Pier No. 7. The 20m curve lies off the W breakwater. The depths alongside range from 4.5 to 124m.

Onahama Sekiyu Sea Berth, a dolphin berth for tankers up to 80,000 dwt, is situated on the N side of No. 2 W breakwater. A light is shown and a horn fog signal is sounded from the center dolphin; an auxiliary light is shown on the dolphin at each end of the berth. There is a depth of 15m alongside. A submarine pipeline is laid from the center dolphin to the shore in the vicinity of an oil refinery, 0.8 mile W. A submarine cable runs from the sea berth to the shore at the root of Misaki Breakwater.

Pilotage.—Pilotage is not compulsory. Pilots normally board in the vicinity of the quarantine anchorage. During strong S winds and high running seas, vessels should not approach too close to the harbor entrance, as there is danger of being set down onto the breakwaters. Large tankers are boarded 2 miles SSE of the Offing Breakwater Light.

Vessels berth in daylight.

Anchorage.—A circular quarantine anchorage is centered 2.3 miles SSW of Mi Saki, in 30m. Another anchorage is situated 0.4 mile SSE of the center of the quarantine anchorage, also in a depth of 30m.

Vessels not equipped with spark screens on their smokestacks, or carrying open flame, or with inadequate fire fighting equipment are prohibited (except by special permission of the harbormaster) from anchoring within 33m of tankers carrying hazardous flammable cargo.

Caution.—Turikurai Iso, a rock with a depth of 7.4m, is located 0.7 mile SW of the light on the head of the W breakwater. Enomori Iso, with a least depth of 16.9m, lies 2.2 miles E of Mi Saki. Fish haven obstructions lie 0.5 mile E of Enomori Iso. Fishing reefs lie 0.3 mile N and 0.5 mile NE of Enomori Iso. A wave meter, marked by a lighted buoy, is on the bottom 1 miles SSE of the Mi Saki breakwater light; a submarine cable runs from this meter to the light. Another fish haven, constructed of concrete blocks, lies 1.5 miles SE of the Onahama Ko No. 1 West Breakwater South Light.

2.38 **Hirakata Ko** (35˚51'N., 140˚48'E.), a small fishing harbor, is situated 6 miles SW of Onahama Ko. It is suitable only for small vessels with local knowledge, as the approach is encumbered with numerous dangers with depths of 2m or less. The harbor is protected by breakwaters. A light is shown at the head of the E breakwater. Vessels with local knowledge may obtain anchorage off Hirakata Ko, in a depth of 20m, mud and sand, with the head of the S breakwater bearing 219˚, distant 0.9 mile.

Caution.—Fixed fishing nets are laid between 2 and 3.25 miles ENE of Hirakata Ko, between March and January.

Otu Misaki (36˚50'N., 140˚48'E.) is a steep point, 40m high, located 1.75 miles SSE of Hirakata Ko. On a plateau about 0.8 mile W of it is a conspicuous grove of pine trees.

Otu Ko, a small harbor protected by breakwaters, is situated 0.5 mile W of Otu Misaki. There are three basins within Otu Ko. The W basin shelters quays having lengths of 150m, with alongside depths of 6m on the N side and 4m on the E side of the basin. Depths in the center and E basins are less; mooring buoys occupy the center of these two basins.

From Otu Misaki, the coast trends in a SSW direction 11 miles to Kawajiri Saki (Kawaziri Saki), a flat point 20m high, with a few pine trees on it.

A shoal, with a depth of 9.4m, is located 1.5 miles offshore, 2.5 miles S of the light structure on Kawajiri Saki. A rock, which uncovers, lies 4 miles NNE of Kawajiri Saki. A fish haven obstruction lies 2 miles SE of this same point. Ose Ko, a small fishing harbor enclosed by breakwaters built on the fringing reef, is situated 5.3 miles SSW of Kawajiri Saki. Lights are shown from this harbor.

Hitachi Ko (Hitati Ko) (36˚30'N., 140˚38'E.)

World Port Index No. 61356

2.39 Hitachi Ko is an open port protected from the E and S by breakwaters. Kuji Gyoko (Kuji Ko), a Kuji Ko fishing port, is enclosed within the breakwater, in the N extremity of the harbor. Momiya Kawa discharges into the harbor and Kuzi Kawa (Kuzi Kawi) flows out between two breakwaters into the S part of the harbor limits.

Winds—Weather.—Northeast and SE winds prevail in the spring, while the summer winds are mainly from the S or NE.

Depths—Limitations.—The entrance to the harbor is from the SSE and is entered between the E and S breakwaters. The 10m curve extends within the harbor entrance; there is a width

of 0.13 mile between the 10m line at the entrance between the breakwaters. The draft limitation in the channel is 8.5m. The depths alongside the wharves range from 4 to 10m. The maximum draft permissible alongside the wharf is 9.5m, and 15,000 dwt.

A harbor has been constructed N of Kuji Ko. There are depths of at least 10m W of the breakwater head, and 7.5 to 10m alongside Suwasita Quay on the S side of the reclaimed land. Reclamation continues W of the breakwaters.

Aspect.—A power station stands on the coast 5 miles N of Iso Saki. Its chimney is marked by obstruction lights, and attains a height of 140m. Another chimney, which attains a height of 90m, stands close S. A framework observation tower, close W of the power station, is also marked by an obstruction light. There are two radio towers, 54m high, situated on the N side of the mouth of the Momiya Kawa, and there are numerous tanks situated about 0.4 mile NE of the radio towers. Hitachi Light is shown from a white concrete tower on Kobochi Hana, 1 mile NE of the wharves. Lights are shown from the breakwaters.

Pilotage.—Pilotage is not compulsory; however, pilots are available and board at position 36˚28'13"N, 140˚39'11"E between sunrise and sunset. Vessels should arrange pilotage if needed through their agent.

Anchorage.—A quarantine anchorage, semicircular in shape, bound on the SE by the harbor limit, has a radius of about 0.2 mile. The depths in the anchorage range from 9.6 to 15m. There is an area prohibited to anchorage on the W side of the E breakwater.

Caution.—Onne Iso, which dries 1.6m, is located about 0.4 mile E of the N extremity of the E breakwater.

A fishing harbor, protected by breakwaters, is situated 1.3 miles S of Hitachi Ko. A light is shown at the head of the N breakwater. Beacons, in line bearing 330˚, lead between the heads of the breakwaters into the harbor, which has general depths of 6m.

2.40 Hitachi-Naka Ko (36˚24'N., 140˚37'E.), a new harbor, lies approximately 5 mile S of Hitachi Ko Breakwater. It was reported there are over 40 berths available with depths of 5.5 to 18m. Vessels up to 130,000 dwt can be accommodated.

Iso Saki (36˚23'N., 140˚38'E.), a low sandy cape with a number of pine trees on it, is located 7 miles S of Hitachi Ko; the cape is fringed with reefs. A light is shown from a round concrete tower, 14m high, on Iso Saki. A lighted buoy is moored 1.5 miles ENE of Iso Saki. Two lighted buoys are moored 3.5 and 4.5 miles N, respectively, of Iso Saki and mark the ends of two submarine water pipelines extending from the shore WSW.

Nakaminato Ko (36˚20'N., 140˚36'E.) is a fishing harbor in the mouth of Naka Kawa and is situated about 3 miles SSW of Iso Saki. The harbor consists of a series of quayed basins, with depths up to 3m. A wave meter, lying 3 miles offshore, is 3.2 miles SSE of Nakaminato Ko.

Kashima Ko (35˚56'N., 140˚42'E.)

World Port Index No. 61357

2.41 Kashima Ko is a coastal harbor, protected by breakwaters, situated 25 miles SSE of Nakaminato Ko; it is an open port. The area between the breakwaters is called the outer port, and the dredged area inland is called the inner port.

This artificial port, the largest single port in Japan, with over 9 miles of wharves serves a new industrial zone E of Tokyo.

Depths—Limitations.—There are depths from 19 to 30m in the approach from the sea to the quarantine anchorage. The channel is entered on a range line that has been dredged to a depth of 24m (1979) for a distance of 1.5 miles over a width of 494m. The depths decrease to 22m and then to 19m in the inner harbor. In the N and S fairways there are depths of 10 to 13m. There are depths at the berths from 5 to 22m.

The crude oil pier on the W side of the S breakwater will accommodate a vessel up to 252,059 dwt and 19m draft. Other berths have no length limitations, but are governed by draft and tonnage.

Aspect.—On the S side of the harbor there is a chimney, 234m high, situated 0.8 mile SW of the root of the S breakwater. There are two chimneys, about 205m high, situated close E of the above chimney. There are two conspicuous radar towers situated 2.3 miles NW of the head of the N breakwater.

Pilotage.—Pilotage is compulsory for vessels over 50,000 grt. Pilots are available between 0645 and 1600 in the summer and 0645 and 1430 in wenter off the S breakwater for oil, chemical, and LPG tankers. For sailing, pilots are available from 0600 to 1700 in summer and 0630 to 1600 in winter. The pilot boards within a circle of radius 1.5 miles centered on position 36 00'N, 140 46'E, about 3.8 miles NE of the light on the S breakwater. All movements at the port are controlled from the signal station near the NW of the harbor entrance.

If weather conditions make boarding vessels of less than 10,000 tons difficult, then with the agreement of the ship's master, the pilot vessel may display flags UH and guide the vessel into the harbor, where the pilot will board.

Signals.—There is a signal station on the N side of the harbor, 0.7 mile SW of the head of the N breakwater. The traffic control signals are shown here.

The signals described in the accompanying table apply to any vessel intending to enter or depart from the fairway leading from the harbor limit into the port area.

Kashima Ko—Signals

Day signal	Night signal	Meaning
A flashing white light every 2 seconds, or a black cone point up	A flashing white light every 2 seconds	Vessels may enter. Vessels of 1,000 grt or over, intending to depart, must stop and wait. Vessels of under 1,000 grt may depart.

Kashima Ko—Signals		
Day signal	**Night signal**	**Meaning**
A flashing red light every 2 seconds or a black cube	A flashing red light every 2 second	Vessels may depart. Vessels of 1,000 grt or over, intending to enter, must wait outside the fairway, keeping clear of vessels leaving. Vessels of under 1,000 grt may enter.
An alternating flashing red and white light every 3 seconds, or two black cones points together	An alternating flashing red and white light every 3 seconds	Tankers of 1,000 grt or over and other vessels of 15,000 grt or over, intending to enter, must wait outside the fairway, keeping clear of vessels leaving. Tankers of 1,000 grt or over and other vessels of 15,000 grt or over, intending to depart, must stop and wait. Tankers of under 1,000 grt and other vessels of under 15,000 grt may enter or depart.
A flashing light, three red and three white flashes every 6 seconds, or two black cones points together, over a red square flag	A flashing light, three red and three white flashes every 6 seconds	No vessel shall enter or depart without directions from the Captain of the Port.

Vessels of 15,000 grt or over and tankers of 1,000 grt or over must report their ETA off the entrance to Kashima Fairway before noon of the preceding day, and their ETD. Any change in ETA must be promptly reported to the Captain of the Port.

A vessel is required to display, disposed vertically, the following flags of the International Code to indicate the position of the wharf to which it is proceeding:

1. Second substitute CN—Central Fairway, N side.
2. Second substitute CS—Central Fairway, S side.
3. Second substitute NW—North Fairway, W side.
4. Second substitute NE—North Fairway, E side.
5. Second substitute SW—South Fairway, W side.
6. Second substitute SE—South Fairway, E side.

Anchorage.—The quarantine anchorage, rectangular in shape, is situated in the N extremity of the harbor limit, 1.8 miles NNW of the head of the S breakwater. The recommended anchorage for large vessels is 2.75 miles NE of the head of the S breakwater, in depths from 21 to 26m. Vessels should stay clear of the approach to the entrance channel.

Vessels not equipped with a spark screen, using open fires, or with inadequate fire controlling equipment are prohibited from approaching within 30m of facilities or vessels involved in handling petroleum products within the port.

Caution.—In rough weather, waves may break over the S breakwater, rendering it invisible to shipboard radar. An overhead cable runs from the NW end of the Kashima Ammonia and Urea Company quay to the SW. The height of the lowest cable is 37m. Fish haven obstructions are situated 5 miles N and 7.6 miles NNW, 2.4 miles and 1.8 miles offshore, respectively, of Kasimo Ko.

Great care is required when entering or leaving the harbor between May and the end of September due to fixed net fishing operations.

From Kashima Ko, the coast trends in a SSE direction for a distance of 13 miles to Tone Gawa (Kawa). O Ne, with a depth of 17m, lies 5.5 miles NE of the mouth of Tone Gawa.

Sunken wrecks, dangerous to navigation, lie 9.1 miles N, 3.6 miles NE, and 4.4 miles NE of the Tone Kawa entrance.

2.42 Choshi Ko (Tyosi Ko) (35˚44'N., 140˚51'E.) (World Port Index No. 61360), a fishing port, is situated inside the mouth of the Tone Gawa. Breakwaters protect the channel leading into the river. A power transmission cable, with a vertical clearance of 26m, spans the mouth of the river.

Inubo Saki Light

A breakwater, marked on its N end by a light, is situated on the S side of the approach to Tone Gawa. A training wall extends in a NE direction toward the mouth of the river and is separated from the breakwater by an opening about 114m

wide. There are several boat harbors in this vicinity. There are several dangers within the 10m lineshown off this river entrance, within 1.3 miles of the shore.

Inubo Saki (35˚42'N., 140˚52'E.), a prominent high point at the E end of Choshi Hanto, which forms the S shore of Tone Gawa, is fringed with reefs and above-water and sunken rocks, up to 0.4 mile offshore. Inubo Saki Light is shown from a round white tower; a radiobeacon and a radar beacon transmit from the light structure. The E side of Choshi Hanto is a sandy beach, and the W side consists of a 20 to 40m high, red earth-covered dark cliff.

Atago Yama, close W of the point, is 74m high and covered with trees; it is conspicuous.